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Preliminary Evidence Assessing Social–Emotional Competences in Deaf and Hard of Hearing Infants and Toddlers Using a New Parent Questionnaire

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Abstract

Social–emotional competences are an important developmental domain for deaf and hard of hearing (DHH) children and early diagnosis of problems is needed to ensure that DHH children receive appropriate support in this domain. In order to explore the usefulness of an instrument, which was recently developed for very young children, two studies in DHH infants and toddlers were conducted from Germany using the Social–Emotional Assessment/Evaluation Measure (Squires et al. (2013). *Social-Emotional Assessment/Evaluation Measure (SEAM)*. Baltimore, ML: Brooks). Preliminary analysis of data obtained from a sample of 182 DHH children aged between 2 and 36 months (Study 1) suggests that it provides valid, reliable data and is suitable for use in practice. The data also corroborate well-known findings from other research in deaf education, in particular the role of parental responsivity for the development of social–emotional competences. Study 2 documents the consistency of evaluations of 44 DHH children by their mothers and by early intervention providers using the scales. Overall, the results suggest that this new evaluation instrument has potential applications in deaf educational practice but further research is needed to demonstrate its full value.

It is well known and documented in scientific literature that good social–emotional development is crucial to a happy and successful life (Calderon & Greenberg, 2011; Dowling, 2014; Umberson & Montez, 2010). Calderon and Greenberg (2011) described the set of skills required for satisfactory social–emotional development, listing, among others, good communication skills, the ability to control one's behavior, the ability to understand one's own motivation, feelings and needs as well as those of others, the capacity to view any situation from multiple perspectives and possession of the social competences needed to build relationships with other people. Healthy social–emotional development involves developing all these skills—and others—and these skills are at the heart of children's social–emotional well-being. They contribute to children's self-confidence and empathy, to their ability to develop meaningful and lasting friendships and partnerships, and their sense of being important and valuable to those around them. Children's social–emotional development is also associated with development in many other areas: cognitive, motor, and language development are all greatly affected by how children feel themselves and how well they express ideas and emotions (Zero to Three, 2016). In summary, social–emotional development provides the foundation for how people feel about themselves and how they experience others. The laying of this foundation begins the day a child is born and continues throughout the lifespan.

The development of social–emotional competences occurs in a process of co-regulation between parent and child (Morris, Silk, Steinberg, Myers & Robinson, 2007). Guralnick (2011) has offered a developmental systems approach to describe the role of early parent–child relationships for developmental progress in general and to understand why early intervention works.

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According to Guralnick, developmental support takes place in the everyday activities of normal family life. In interacting with a child with developmental problems, the success of parental encouragement depends on the ability of the parents to accommodate to the unique constellation of their child's developmental and behavioral characteristics. It is the parents' responsivity to the child's special needs that plays a particularly important role here. Features of parental responsivity are—among others—showing affection, responding to the child's interests, establishing joint attention, and matching language to the child's receptive language level (Warren & Brady, 2007).

Regarding the situation of deaf and hard of hearing (DHH) children, we know that they face specific challenges in their development. Empirical findings regarding various domains of development reveal that reduced auditory perception and its correlates have an impact on a great many processes that are important for effective and interactive understanding of the world, and that special allowances must be made for this when raising and educating DHH children (for a review, see Hintermair, 2014; Knoors & Marschark, 2014).

There are multiple reasons why educating a DHH child represents a specific challenge. One of these, which may be especially relevant in the early years, is that 90% of the parents of DHH children are themselves hearing (Mitchell & Karchmer, 2004). Generally, this means that they have no experience of what hearing loss means. Therefore, they may be confused by some of the behaviors of their DHH child (e.g., no reaction to auditory events) and their intuitive parenting including parental responsivity mentioned above may be affected (Meadow-Orlans, Spencer & Koester, 2004).

Nevertheless, DHH children's developmental prospects, in general, have improved in recent decades. One of the reasons is that the early detection of children with a potential hearing loss is improved through the Universal Newborn Hearing Screening (UNHS) program (National Center for Hearing Assessment and Management, 2013). In Germany, where this study has been conducted, an area-wide UNHS program has been mandated for all 16 federal states in 2009. This system works rather well, but there are still some shortcomings (Brockow et al., 2014; Matulat et al., 2014). In particular, the situation of children who need a follow-up examination after they have been detected by the first screening test in hospital is still not satisfactory. While the charge for the first screening procedure in the hospitals has been managed by the legal regulations since 2009, it is still not clarified nationwide how the tracking procedure can best be organized and in particular how it can be funded in the future. When a child's hearing loss is confirmed, the families promptly get access to one of the over 70 early intervention centers, most of them are affiliated to a school for the deaf, while a few offers are also organized by private organizations. The support offered by these early intervention centers includes family counseling, language–speech training, the opportunity to get contacts with other families who have a DHH infant and support regarding all questions around hearing loss. The majority of the early intervention providers in Germany still follow a spoken language approach but during the last decade also bilingual approaches have arisen in German deaf early intervention (Renzelberg, 2008).

The implementation of the UNHS (in particular, in western countries of the world) has contributed to a considerable improvement of the opportunities for DHH children to develop language at a roughly appropriate age and has also brought parallel improvements in cognitive and social–emotional developmental processes dependent on language. Empirical studies show that DHH children diagnosed early have significant advantages in language development (Kennedy, McCann, Campbell, Kimm, & Thornton, 2006; Yoshinaga-Itano, 2003, 2006). Note, however, that although the overall trend is positive, there is still high variability in the developmental trajectories of DHH children (Marschark & Hauser, 2012; Spencer & Marschark, 2010) and, moreover, there are still obvious differences between the language development of groups of DHH children and hearing children even when children with cochlear implants are included (cf. Duchesne, 2016; Fagan, 2016; McGowan, Nittrouer, & Chenausky, 2008).

This applies in a comparable way for recent results on social–emotional development in DHH children (Antia & Kreimeyer, 2015; Barker *et al.* 2009; Dirks, Uilenburg & Rieffe, 2016; Hintermair, Krieger & Mayr, 2011; Hoffman, Quittner & Cejas, 2015; Rieffe, Netten, Broekhof & Veiga, 2015; Stika et al., 2015; Wiefferink, Rieffe, Ketelaar, De Raeve & Frijns, 2013; for a review of psycho-social development, see Hintermair, 2014).

Hoffman et al. (2015) presented a study testing the relationship of language development and social development in preschool-aged DHH children. They investigated 74 DHH children with a mean age of 40.9 months (*SD* = 8.8) and a hearing control group with 37 children. The groups did not differ regarding age, gender, and ethnic composition. The mean age for onset of hearing loss in the DHH group was 5.5 months (*SD* = 10.8) and all children were severely to profoundly deaf. The authors did not present any information about early intervention services utilized by the children's families. All children were presented at a hospital for a baseline assessment in preparation for implant surgery. To evaluate children's social competences, the Social Competence Composite scale from the Social Competence and Behavior Evaluation—Preschool Edition (SCBE; LaFreniere & Dumas, 1995) and the Social–Emotional Assessment Inventory (SEAI; Meadow-Orlans, 1983) were used. For testing language development, the Reynell Developmental Language Scale (RDLS; Reynell & Gruber, 1990) and the MacArthur–Bates Communicative Developmental Inventories (CDI; Fenson *et al.* 1993) were applied. The results revealed a significant difference regarding the social competences between the DHH and the hearing children indicating that the DHH showed less favorable outcomes. The inspection of the relations between language age, hearing status, and social competence in the DHH group using a path model revealed that only language development predicted social competences. This study showed the better the (spoken) language skills, the better the social skills that the children developed.

Barker et al. (2009) investigated, in a cross-sectional study, the relationship between language, attention, parent–child communication, and behavior problems in preschool-aged DHH children. The authors examined 116 infants and toddlers with a severe to profound hearing loss ranging in age from 1.6 to 5 years. They also had a hearing control group with 69 children of the same mean age. The two groups did not differ regarding gender, age, and race, but they did regarding child's ethnicity, intellectual functioning as well as parents' age, education, and income. As the Hoffman et al. study (2015) presented above, the children in this study were also investigated in preparation for implant surgery. Different measurement instruments were used to assess the relevant variables in the study (parent report, videotaped observations, and performance results). Regarding language measures, the authors also like Hoffman et al. (2015) used the RDLS (Reynell & Gruber, 1990), which includes a verbal comprehension scale and an expressive language scale; additionally, likewise the MacArthur–Bates CDI (Fenson et al., 1993) were applied. To assess behavioral problems of DHH children, the Child Behavior

Checklist (CBCL; Achenbach & Rescorla, 2000) was used, which allows testing internalizing (e.g., social withdrawal, feelings of loneliness and sadness) and externalizing (e.g., aggression, impulsive behaviors) problems in children. The authors used a path analysis to reveal direct effects of language on the children's behavioral problems, as well as indirect effects of language on behavior through the children's attention. The results confirmed the authors' hypothesis that better spoken language competencies were associated with fewer externalizing problems as well as with fewer less internalizing problems; there is a direct effect from language to externalizing problems, and an indirect effect on internalizing problems through effects on attention. Of additional interest is that there was no relationship between the amount of communication by the children with their parents and behavioral problems. This result may indicate that the quality of communication is more important than its quantity, but further data are necessary to confirm this.

Hintermair et al. (2011), in an empirical study with 112 preschool-aged DHH children (mean age 61.1 months, *SD* = 11.1), investigated the relationship between social–emotional well-being and communicative competence. All DHH children attended a kindergarten, 69 of them a kindergarten at a school for the deaf; the other children attended a regular kindergarten. A small percentage (12.5%) of the children did get early intervention support prior to 12 months. Thirty-one percent of the DHH children had a mild to moderate hearing loss, 69% a severe to profound hearing loss. No information was available on which kind of early intervention support the families of the DHH infants received. The authors used, for their study, a German observation scale on socio-emotional well-being and resilience in early childhood care (PERIK; Mayr & Ulich, 2006) and the Communication Competence Index (CCI; Hintermair, 2012), a short survey scale, which asks parents or teachers how well the DHH child is able to understand other people in their environment and how well they can explain their intentions to other persons. The PERIK scale covers various domains such as interpersonal skills, self-monitoring, self-assertiveness, stress regulation, initiating structure, and joy in explorations. A comparison of DHH children with hearing children from a German normative sample revealed that DHH children, who attended a kindergarten at a special school for DHH children, showed lower scores on many socio-emotional domains than DHH children from a regular kindergarten and hearing children. Communicative competencies evaluated by the teachers were highly correlated with all tested domains of the PERIK questionnaire, indicating that children with better communicative competencies showed higher scores on psycho-social developmental domains. DHH children who started early intervention less than 12 months after birth revealed significant higher scores in initiating social contacts and better stress regulation competences than DHH children with a start later than 12 months after birth.

Stika et al. (2015) compared developmental outcomes in 28 early-detected toddlers with mild to severe hearing loss aged 12–18 months and 42 hearing toddlers of the same age. All children were identified by UNHS and amplified, on average, by five months of age. In this study, the authors explicitly asked the parents of the DHH children for differentiated information regarding their experiences with early intervention and their satisfaction with the quality of the support provided. The families had received support on average for eight months, mostly once or twice a month. The majority of them were visited at home. Sixty-eight percent of the families received early intervention by one provider, the other families by two or more providers. Eighty percent of the parents evaluated the support provided as "good" or "excellent", nevertheless 22% of them requested more involvement in the early intervention program. To evaluate child development, the authors used a large number of instruments to assess the development of the DHH children in several domains. Regarding the social–emotional domain, they conducted the Infant–Toddler Social and Emotional Assessment (ITSEA; Carter & Biggs-Gowan, 2006) and the Vineland Adaptive Behavior Scales (Vineland II; Sparrow, Cicchetti & Balla, 2005). The results revealed that the DHH toddlers had comparable outcomes to hearing children with respect to externalizing, internalizing, and dysregulation domain and the competences measured by the ITSEA competences scales. The data on the Vineland II scales revealed comparable results. There were no significant differences regarding communication, daily living skills, socialization, and motor skills.

In a recent study, Dirks et al. (2016) also investigated a group of 30 early-detected DHH toddlers (mean age: 27.7 months, *SD* = 5.6) with moderate to severe hearing loss and compared the parental stress experiences and developmental outcomes of this group with those of a control group of 30 hearing controls. Again, in this study, all children were detected by UNHS, 18 of them received their hearing aids within six months after birth. All families, except one, received support by an early family intervention program, which included family counseling, speech therapy, and playgroups for the children. Eighteen families started with this program within the first six months after birth. In exploring the social–emotional domain, the authors used the ITSEA instrument and their findings were consistent with those of Stika et al. (2015): they found no differences between the DHH children and their hearing peers in four social–emotional domains assessed.

A consistent evaluation of the data presented on socio-emotional development in young DHH is difficult. Some results suggest that early detection of a hearing loss and subsequent early start of a family-centered early intervention program may provide outcomes in social–emotional development comparable to those of hearing toddlers (Dirks et al., 2016; Stika et al., 2015). Others show various problems of DHH children in the social–emotional domain (Barker et al., 2009; Hintermair et al., 2011; Hoffman et al., 2015). A closer look at these studies reveals some differences in the samples investigated. The children in these studies were older and also had a severe to profound hearing loss compared to the toddlers in the Stika et al. study and Dirks et al. study who mostly had a moderate hearing loss. So we do not know how far the identification of social–emotional problems in DHH children may be confounded with the degree of hearing loss and the children's age. Perhaps some problems in DHH social–emotional development may not occur at very early ages and arise only when the children grow older and the communicative problems increase. Also a lesser degree of hearing loss may make it easier for DHH children to get access to the hearing world and early intervention may be more successful in this group of toddlers. Another issue is that the instruments developed for hearing toddlers might not be sensitive enough at this very early age to detect deaf-specific problems in DHH infants' development.

In spite of these inconsistent research results, there is no doubt that it is important to assess the competences of DHH children early on, in order to decide on the best communicative approaches for each child's development. This requires a great deal of diagnostic effort; Geers (2006) argued for better methods of assessing the language skills of DHH children at very young ages, regardless of the communication mode. Evaluating language development in very young DHH infants is still not enough; however, we also need, to evaluate their social–emotional development to prevent early developmental delays as a prerequisite for full social participation.

Unfortunately, there are not many instruments available for the evaluation of social–emotional development at very young ages. In recent years, the ITSEA (Carter & Biggs-Gowan, 2006) has been used several times, including samples of DHH children (Dirks et al., 2016; Stika et al., 2015, see above). The ITSEA is a research-based clinical tool for identifying social–emotional problems and competences that may be areas of concern in children aged from 12 to 35 months old. It includes a Parent Form and a Childcare Provider Form. It covers four domains: externalizing behaviors, internalizing behaviors, dysregulation behaviors, and competences. It comprises 17 subscales and it is standardized, and norms are based on data from a nationally representative sample from the USA.

A very recently introduced instrument designed specifically to evaluate early social–emotional competences is the Social–Emotional Assessment/Evaluation Measure (SEAM) developed by Squires et al. (2013). The SEAM is a functional tool for assessing and monitoring social–emotional and behavior development in infants, toddlers, and preschoolers at risk for social–developmental delays or problems (Squires et al., 2013). It has three apparent advantages over the ITSEA instrument which it particularly interesting to researchers and practitioners in deaf education. First, it can be used from as early as 2 months of age, whereas the ITSEA measure is not recommended for use with infants of less than 12 months. Second, the SEAM takes a positive approach to assessment of development and focuses exclusively on competences (cf. Antia & Kreimeyer, 2015); it also incorporates a somewhat broader spectrum of social–emotional competences than the ITSEA instrument. Finally, the SEAM provides a series of praxis examples for every item; this makes the tool very attractive for early intervention providers, because these praxis examples can be used to initiate a dialog between caregiver and early intervention provider if the SEAM evaluation suggests the child has problems in a particular domain. The two instruments use partially different labels for the various socio-emotional domains they assess. However, a nearer look on the items used for evaluating the domains reveals that mostly similar issues are covered by the SEAM and the ITSEA (e.g., "Mastery Motivation" from the ITSEA corresponds considerably with "Exploring self and surrounding/Demonstrating independence" from the SEAM). There is a clear tendency that the SEAM scales take a more detailed look on socio-emotional development. The SEAM might be useful for application in the early intervention of very young DHH children.

An important issue regarding the evaluation of early developmental processes in children is to consider who will be the informant and how reliable are the evaluations given by different informants. Parents and professionals may evaluate developmental processes of children from different perspectives that include various educational backgrounds and different experiences with the child. There are some studies on rater agreement between parents and professionals of children with typical development (see for a review Glascoe & Marks, 2011). They show that gross and fine motor development and language development appear to be more easily observable than skills in the field of perception, thinking, feelings, and self-regulation. Therefore, the rater agreement is higher for the first-mentioned developmental domains.

Disagreement might be greater when rating the behavior of children with a disability because parents' hopes and wishes may affect the reliability and validity of the evaluations. According to Deimann and Kastner-Koller (2011), parents of children with a disability significantly overestimate the skills of their children compared to parents of children without a disability. These results stress the importance to compare ratings obtained from parents to ratings obtained from other individuals who know the child sufficiently well. Therefore, in our study, we aimed to analyze similarities and differences between SEAM ratings obtained from parents and from professionals working with their DHH children in early intervention.

Aims of the Study

We sought to gain insight into the value of the SEAM in research and practice with DHH infants and toddlers. To do this, we used a preliminary German version of the SEAM in two studies.[1]

The main purposes of Study 1 were to assess the reliability of the SEAM in DHH children, to describe the development of DHH children in terms of several domains assessed by the SEAM, to investigate the relationship between the SEAM and a subset of ITSEA competences, and to assess the relationship between the SEAM competences and the parental competences of the parent raising a DHH child. We used the SEAM with a group of 182 DHH infants and toddlers and their parents.

The aim of Study 2 was to determine whether there were differences between the evaluations of deaf children made by their mothers and by early interventionists in order to assess the reliability of parental evaluations of a DHH infant or toddler. For this purpose, we used the SEAM and ITSEA with a new sample of 44 DHH infants and toddlers. The questionnaires were completed by the children's mothers and by the early interventionists supporting the families.

Study 1

Method

Participants

All demographic data are based on information from parental informants, most of whom were mothers (mean age = 34.1 years; $SD = 4.4$). Participants were split into a younger group (aged 2–18 months, $n = 52$) and an older age group (19–36 months, $n = 130$). Of note 5% and 10%, respectively, of the infants in the younger and older age groups had deaf parents ($\chi^2 = 1.63$, $df = 1$, $p < .20$). The distribution of child gender in both groups was similar. The mean age of the younger group was 12.9 months ($SD = 3.9$), for the older group, it was 26.8 months ($SD = 5.6$). Just over half (56.6%) of the children had mild or moderate hearing loss, 23.6% had severe hearing loss and 19.8% had profound hearing loss. There have been no significant differences between the two age groups regarding the children's degree of hearing loss ($\chi^2 = 1.47$, $df = 2$, $p < .48$). About 22% of the children in both age groups wore a cochlear implant. As expected most of the infants and toddlers with a cochlear implant had profound hearing loss ($\chi^2 = 104.65$, $df = 2$, $p < .001$; $N = 31$ out of 36). Only 9.6% and 13.1%, respectively, of younger and older children had other disabilities; this low number of children with additional handicaps may be due to the young age of the sample. Most of the disabilities listed by parents were ones that are detectable immediately after birth (e.g., genetic syndromes, visual or physical impairments, Down's syndrome). The data on mode of communication indicated that the majority of parents in this sample (83%) used spoken language with their DHH child; only 17% of the parents used both spoken and sign language. As expected, preferred mode of communication was associated with several other characteristics. Deaf parents, parents of children with more severe hearing loss (severe or profound), and parents of children with additional disabilities were more likely to use both spoken and sign language with their child. Regarding the educational status of the parents, the data revealed that 37% had a Junior Highschool degree (German

Realschule education; 10 years of schooling), 48% had a Highschool degree (German *Gymnasium*; 12–13 years of schooling), and 15% only had graduated Elementary or Middleschool (German *Hauptschule*; nine years' total schooling).

Instruments and measures

Social–Emotional Assessment Measure

The SEAM covers 10 benchmarks for social–emotional competence in three age categories (infants, toddlers, preschoolers) and 4 benchmarks for core parental competences organized into the same age categories. The age range of our sample meant that we only used the items for infants and toddlers.

The part of the SEAM dealing with child competences consists of 35 items each for the two age groups we investigated (2–18 months, 19–36 months).

1. *Participation in healthy interactions* (4/4 items. Examples: "Baby shows interest in you and other familiar caregivers"; "Toddler initiates and responds to affection").[2]
2. *Expression of a range of emotions* (3/4 items. Examples: "Baby smiles at familiar people"; "Toddler expresses a range of emotions in a variety of ways").
3. *Regulation of own social–emotional responses (with caregiver support)* (3/3 items. Examples: "Baby responds to your soothing when upset"; "Toddler can settle self down after periods of exciting activity").
4. *Empathy for others* (4/3 items. Examples: "Baby looks at and notices others' emotional responses"; "Toddler tries to comfort others when they are upset").
5. *Attention to and engagement with others* (4/5 items. Examples "Baby focuses on events shown by you and others"; "Toddler focuses on events that you show him or her").
6. *Exploring self and surroundings/demonstrating independence* (4/3 items. Examples: "Baby explores surroundings"; "Toddler tries new tasks before seeking help").
7. *Positive self-image* (3/3 items. Examples: "Baby laughs or smiles at own image or picture of self"; "Toddler tells you what she or he did or accomplished").
8. *Regulation of activity level and own attention* (3/4 items. Examples: "Baby looks at books or pictures for several minutes or longer"; "Toddler looks at book or listens/looks to story for 5 minutes or longer").
9. *Cooperation with daily routines and requests* (3/2 items. Examples: "Baby cooperates with diaper and clothing changes"; "Toddler cooperates with simple requests").
10. *Range of adaptive skills* (4/4 items. Examples: "Baby eats and gains weight on schedule"; "Toddler accepts changes in routines and settings").

Each item is accompanied by several examples to assist caregivers in completing the SEAM and to give families an idea of how their child might demonstrate the behavior. All items are rated by the respondent using a Likert scale: "very true" = 3; "somewhat true" = 2; "rarely true" = 1; "not true" = 0. The respondent is also given the opportunity to note if a certain item is of concern for them (see "Results" for information on reliability). Currently, there are no normative data available for this instrument.

The second part of the SEAM asks parents to evaluate their own competence to promote their DHH child's development. A similar Likert scale is used to rate items ("mostly" = 3; "sometimes" = 2; "not yet" = 1; "not sure" = 0). The items (2–18 months group: $n = 14$; 19–36 months group: $n = 17$) are related to the following four competences:

1. *Parental responsivity* (3/6 items. Examples: "I know how to help my baby calm down"; "I know how to support my child's emotional needs").
2. *Providing activities and playing with the child* (2/2 items. Examples: "I know games and activities that my baby enjoys"; "I know the age-appropriate games that my child enjoys").
3. *Providing predictable schedule/routines and appropriate environment* (3/4 items. Examples: "I use daily activities as playtime or make time each day to play with my baby"; "I provide my child with predictable limits and consequences").
4. *Providing a safe home and play environment* (6/5 items. Examples: "I know ways to keep my baby safe throughout the day"; "I have done a safety check on my home to make it safe for my child").

Again, several examples are given for each item to make the essentials of the behavior in question clear to the parent (see "Results" for information on reliability).

Infant–Toddler Social and Emotional Assessment

We used only the 6 subscales (comprising 37 items) of the ITSEA which deal with specific child competences. The ITSEA is standardized and norms are based on data from a nationally representative sample from the USA:

Compliance (8 items. Examples: "is well-behaved"; "obeys when asked to stop being aggressive").
Attention (5 items. Examples: "can pay attention for a long time"; "plays with toys for 5 minutes or longer").
Mastery Motivation (6 items. Examples: "enjoys challenging activities"; "keeps trying to do something even when it's hard").
Imitation/play (6 items. Examples: "imitates clapping or waving bye-bye"; "pretends that objects are something else").
Empathy (7 items. Examples: "tries to help when someone is hurt"; "is aware of other people's feelings").
Prosocial peer relations (5 items. Examples: "plays well with other children"; "has at least one favorite friend (a child)").

The competences were rated by the parents using a 3-point Likert scale ("not true/rarely" = 0; "somewhat true/sometimes" = 1; "very true/often" = 2). Raw scores for the six subscales can be summed to give a total competence score. The ITSEA subscales were only administered to parents of DHH toddlers aged 12 months and older, because the ITSEA has been developed and standardized for children aged between 12 and 35 months.

Data on the internal consistency of the ITSEA competences scale are reported in the ITSEA manual (Carter & Briggs-Gowan, 2006) and indicate satisfactory or very good internal consistency (Cronbach's alpha for the subscales: 0.56–0.79; Cronbach's alpha for total competence score: girls = 0.89, boys = 0.90). In this study, the competence scales also had good internal consistency (Cronbach's alpha for the subscales: 0.77–0.89; Cronbach's alpha for total competence score: girls = 0.94, boys = 0.95).

Additional data

Additional factors were assessed (see "Participants"). We collected data on sociodemographic variables (child's and parental respondent's gender, child's age, and parental educational

status) and hearing loss-related variables (child's hearing status, use of cochlear implant, additional disabilities, parental hearing status, and mode of communication with the child).

Procedure

The data for this study were collected between January and April 2015. We invited 20 early intervention centers for DHH infants and toddlers in 4 German states to participate in the study. The heads of the centers reported back to the authors the number of families they were working with who had a DHH infant or toddler aged between 2 and 36 months. We then sent the appropriate number of questionnaires to each center and the centers distributed them to the relevant families. Parents were provided with a sealable envelope in which to place the completed questionnaire to ensure that their data remained anonymous. These envelopes were collected by the heads of the intervention centers who returned them to the researchers. We distributed 402 questionnaires and received 190 responses of which 8 questionnaires had to be excluded because the high number of missing data points. The final sample consisted of 182 questionnaires (return rate = 45.3%).

All statistical analyses were performed with SPSS version 22.0.

Results

Reliability of the SEAM scales in DHH infants and toddlers

The first aim of the study was to assess the reliability (internal consistency) of the SEAM scales in DHH infants and toddlers. Squires et al. (2013) report for the original version of the SEAM good internal consistency across the 10 benchmarks of social–emotional competencies for the various intervals (2–18 months: Cronbach's alpha = 0.90; 19–36 months: Cronbach's alpha = 0.91). Similarly, satisfactory scores were obtained for our data (2–18 months: Cronbach's alpha = 0.93; 19–36 months: Cronbach's alpha = 0.95). In our data, internal consistency was lower for the parental competences than the child competences; it was satisfactory for the younger age group (2–18 months: Cronbach's alpha = 0.82), but marginal for the older age group (19–36 months: Cronbach's alpha = 0.60). Information on internal consistency is not given in the SEAM manual.

Descriptive statistics for DHH infants' and toddlers' social–emotional competences and their parents' parental competences

Table 1 presents the mean scores for parents' ratings of DHH infants' and toddlers' social–emotional competences and evaluations of the parental competences for both age groups (2–18 months, 19–36 months). Because currently there are no normative data available for a hearing population, we can only provide a descriptive analysis of these variables. In both age groups, the mean score for five domains of child competence ("Participation," "Expressing emotions," "Self-regulation," "Autonomy," and "Cooperation") was > 2.6 (maximum score = 3); scores in this range may be an indication of good development. In both age groups, mean scores were < 2.6 for the domains "Empathy" and "Positive self-image." Intragroup comparison regarding these two lower scored domains versus the five competence domains scored > 2.6 using a paired sample *t* test and a Bonferroni correction to adapt the alpha level revealed for all comparisons significant differences ($p < .001$). Exclusively for the younger age group, the domains "Attention" and "Regulation of activities," and for the older age group, the domain "Adaptive Skills" are scored lower than 2.6. Scores for these domains were different from scores for the high-score domains ($p < .001$).

In both age groups, parental competence scores for all four domains were rather high (all Ms > 2.79). There was some evidence that the parents of the older children rated their competence more highly, with exception of the responsivity domain (all Bonferroni-corrected comparisons significant at least at the $p < .01$ level).

Relationships between the SEAM scales and ITSEA scales in surveying social–emotional competences of DHH infants and toddlers

Table 2 shows correlations between the SEAM scales and the ITSEA scales with respect to social–emotional competences in DHH infants and toddlers.

Scores for related domains in the two instruments are consistently correlated, but the magnitude of the correlations varies widely. SEAM social–emotional competences were positively

Table 1. Mean scores and standard deviations of the SEAM scales on DHH infants' social–emotional competences and parents' competences

	Age group 2–18 months		Age group 19–36 months	
	M	SD	M	SD
Social–emotional competences of DHH infants and toddlers (SEAM)				
Participation	2.77	0.43	2.66	0.57
Expressing emotions	2.87	0.33	2.66	0.44
Self-regulation	2.75	0.34	2.72	0.45
Empathy for others	2.48	0.64	2.20	0.86
Attention/engagement	2.53	0.66	2.78	0.49
Exploring/autonomy	2.88	0.44	2.74	0.50
Self-image	2.29	0.87	2.18	0.99
Activity level	2.39	0.80	2.74	0.53
Cooperation	2.70	0.51	2.66	0.69
Adaptive skills	2.71	0.42	2.34	0.56
Parental competencies raising their DHH infants/toddlers (SEAM)				
Parental responsivity	2.83	0.31	2.87	0.25
Providing activities and playing	2.79	0.48	2.96	0.15
Providing predictable schedule/routines and appropriate environment	2.85	0.28	2.93	0.20
Providing a safe home and play environment	2.86	0.23	2.93	0.14

Note. SEAM = Social–Emotional Assessment/Evaluation Measure; DHH = deaf and hard of hearing.

correlated with the ITSEA measures. In particular, correlations between the SEAM domain "Self-regulation" and the ITSEA scales were fairly small. The SEAM manual presents comparable correlations between the SEAM scales and the ITSEA measure for hearing children.

Relationships between DHH infants' and toddlers' social–emotional competences, parental competences, and sociodemographic characteristics

Multiple linear regression was used to determine the extent to which infants' and toddlers' social–emotional competence was predicted by scores for the four SEAM parental competences and by sociodemographic variables (age, gender, child's and parents' hearing status, additional disabilities, parental educational status, mode of communication). To do this, we calculated a mean total competence score from the data on the 10 SEAM social–emotional child competences and used this as the criterion variable in the regression equation; parental competences and sociodemographic variables were included as independent variables. Separate regression analyses were carried out for the two age groups.

The results for the younger age group (2–18 months) revealed that 67% of the variance in the DHH infants' social–emotional competence was accounted for by the independent variables ($F(11, 36) = 9.77$, $p < .001$ $R^2 = 0.67$). Two of the parental competences also predicted infant social–emotional competence, parental responsivity ($\beta = 0.23$, $p < .04$), and provision of adequate activities and playing opportunities ($\beta = 0.37$, $p < .004$). The sociodemographic predictors were child's age ($\beta = 0.40$, $p < .001$) and the presence of an additional disability ($\beta = -.41$, $p < .001$). These results indicate older infants and infants without an additional disability had higher social–emotional competence, and that parents who perceived themselves as having a responsive parental style and felt able to stimulate their DHH child adequately had children with greater social–emotional competences.

The results for the older group (19–36 months) indicate that 49% of the variance in socio-emotional development score was accounted for by the independent variables included in the regression ($F(11, 108) = 11.21$, $p < .001$, $R^2 = 0.49$). In this group, the only parental competence to predict toddlers' social–emotional competence was responsivity ($\beta = 0.32$, $p < .001$) and as for the younger group, sociodemographic predictors were child's age ($\beta = 0.14$, $p < .05$) and the presence of an additional disability ($\beta = -.44$, $p < .001$): older toddlers and toddlers without an additional disability had better social–emotional competence scores. But in the toddler group, there were a number of other predictors of social–emotional competence: DHH child's hearing status ($\beta = -.15$, $p < .04$), parents' hearing status ($\beta = 0.15$, $p < .04$), and parents' educational background ($\beta = 0.22$, $p < .002$): DHH toddlers with deaf parents, toddlers with less severe hearing loss, and toddlers with better educated parents had higher social–emotional competence scores.

The mode of communication used with the child did not predict social–emotional development in either age group.

Study 2

Method

Participants

Forty-four DHH infants and toddlers participated in this study, 20 were in the younger age group (2–18 months), and 24 in the

Table 2. Correlations (Pearson) between SEAM scores and ITSEA scores in DHH toddlers ($N = 164$)

	SEAM scales									
ITSEA scales	Participation	Expressing emotions	Self-regulation	Empathy for others	Attention/engagement	Exploring/autonomy	Self-image	Activity level	Cooperation	Adaptive skills
Compliance	0.37***	0.28***	0.31***	0.39***	0.52***	0.37***	0.45***	0.43***	0.40***	0.29***
Attention	0.48***	0.35***	0.31***	0.35***	0.49***	0.39***	0.45***	0.61***	0.38***	0.31***
Mastery motivation	0.54***	0.46***	0.18*	0.42***	0.62***	0.66***	0.46***	0.59***	0.57***	0.45***
Imitation/play	0.60***	0.42***	0.20*	0.49***	0.70***	0.47***	0.59***	0.64***	0.63***	0.42***
Empathy	0.49***	0.50***	0.19*	0.70***	0.52***	0.37***	0.59***	0.47***	0.48***	0.38***
Peer relations	0.42***	0.42***	0.17*	0.53***	0.41***	0.36***	0.54***	0.43***	0.39***	0.31***
Total competence	0.62***	0.58***	0.32***	0.67***	0.69***	0.57***	0.71***	0.65***	0.62***	0.46***

Note. ITSEA = Infant–Toddler Social and Emotional Assessment; SEAM = Social–Emotional Assessment/Evaluation Measure; DHH = deaf and hard of hearing.
*$p < .05$; **$p < .001$.

older age group (19–36 months). In all cases, sociodemographic data were provided by the child's mother.

The distribution of gender was even in both age groups, although there were slightly more girls than boys in the younger group and slightly more boys than girls in the older group. The mean age of the younger group was 14.9 months ($SD = 3.2$) and the mean age of the older group was 28.4 months ($SD = 4.6$). More than the half the children (54.5%) had mild to moderate hearing loss, 22.7% had severe hearing loss, and 22.7% had profound hearing loss. In the vast majority of cases (88.6%), the hearing impairment had been detected by UNHS. None of the infants in the younger group had a cochlear implant, whereas 16.7% of the older group did ($\chi^2 = 3.67$, $df = 1$, $p < .056$). As expected most of the children with a cochlear implant had profound hearing loss ($\chi^2 = 14.96$, $df = 2$, $p < .001$). Twenty percent of the younger age group and 33% the older group had an additional disability, usually a mental or physical problem. Fifteen percent of mothers in the young group were deaf, whereas only one mother (4.2%) in the older group was deaf. The vast majority (85%) of mothers indicated that used only spoken language with their DHH infant or toddler; 15% used both spoken and sign language. Mode of communication was associated with some other factors. Deaf mothers and mothers of DHH children with a severe or profound hearing loss were more likely to have decided to use sign and spoken language with their child. Almost three quarters of mother had a university entrance qualification.

Instruments and measures

The measures were the same as in Study 1. The reliability (internal consistency) of the SEAM child competences scales was comparable to that reported in the manual and to the values observed in the other two studies presented here (2–18 months: Cronbach's alpha = 0.96; 19–36 months: Cronbach's alpha = 0.96). The same was true of reliability statistics for the SEAM parental competences scales (2–18 months: Cronbach's alpha = 0.79; 19–36 months: Cronbach's alpha = 0.72). In this study, the SEAM scales were also completed by early intervention providers and their data confirmed the reliability of the scales (Cronbach's alpha for child competences in both age groups = 0.95; Cronbach's alpha for parental competences in both age groups = 0.74).

The reliability of the ITSEA scales was satisfactory, with the exception of the "Peer relations" scale in the younger age group (Cronbach's alpha for the competences subscales between 0.51 and 0.95). This applies to the mothers' ratings as well as to the early intervention providers' ratings. In both age groups, the total competence score had very good internal consistency when completed by both mothers and early intervention providers (Cronbach's alpha 0.95–0.98).

All statistical procedures were carried out in SPSS 22.

Procedure

The data for this study were collected between January and April 2016. We contacted a large early intervention center for DHH infants and toddlers in Germany to recruit an acceptably large sample of mothers and early intervention providers. The head of the center reported the number of infants and toddlers within the 2–36 month age range to the authors and forwarded questionnaires to their families. Mothers who were willing to participate filled in the questionnaire and sent it back to the early intervention center in a sealed envelope. Then, the early intervention providers working with mothers who had returned the questionnaire were asked to complete the same scales. The wording was adapted for the providers, so if an item for the mother worded "Your baby shows interest in you and other familiar caregivers," the wording for the early intervention provider was "The baby shows interest in his/her mother and in other familiar caregivers." Overall, 76 questionnaires were distributed to families and 48 pairs of mothers and early intervention providers completed questionnaires. Four questionnaires had to be excluded from analysis because there was too much missing data, so the final sample comprised 44 pairs of questionnaires (return rate = 57.9%).

Results

Comparison of mothers' and early intervention providers' ratings of the social–emotional competences of infants and toddlers

We used two series of paired sample t tests to compare the evaluations of mothers and early intervention providers in the two age groups, applying the Bonferroni correction to the alpha level ($p < .005$). In the younger group, the only difference between mothers' and intervention providers' rating was in score on the ITSEA "Peer relations" scale. Mothers evaluated their infants' peer relationships more positively than did the intervention provider working with the family ($t = 2.84$, $df = 12$, $p < .015$). It should be noted that the reliability of this scale was poor in both groups of raters (mothers: Cronbach's alpha = 0.51; intervention providers: Cronbach's alpha = 0.56) and once the Bonferroni correction was applied the difference was no longer significant.

The picture was somewhat different in the older group. There were no rater differences in SEAM scale scores, but there were differences in several ITSEA scores ("Peer relations": $t = 2.67$, $df = 20$, $p < .015$; "Attention": $t = 2.42$, $df = 22$, $p < .02$; "Mastery motivation": $t = 3.67$, $df = 23$, $p < .001$; "Empathy": $t = 3.43$, $df = 16$, $p < .003$). After the Bonferroni correction procedure was applied, the only difference between raters was in "Mastery motivation" scores. Comparison of the ITSEA total competence scores awarded by mothers and intervention providers indicated that parents' evaluated their toddler's social–emotional competence more favorably than did the intervention provider working with the family ($t = 2.58$, $df = 15$, $p < .02$).

Separate analysis of the subsample of infants and toddlers with an additional disability (as a group with specific challenges) revealed a similar pattern of results compared to the data obtained with the whole sample. Additional descriptive statistics on the distribution of the 10 social–emotional competences that are not presented confirmed the Study 1 finding that scores for all competences were in the same range and that once again scores for "Empathy" and "Positive self-image" were lower than the other scale scores.

Discussion

The purpose of the two studies presented in this study was to introduce the SEAM as a new instrument that exclusively provides information on social–emotional development of infants, toddlers, and preschoolers from a competence perspective (Squires et al., 2013). Social–emotional development is a crucial domain of child development, and it is well documented that DHH children are at risk for developmental problems in this domain (Antia & Kreymeier, 2015; Hintermair, 2014; Knoors & Marschark, 2014; Van Gent & Sleeboom-van Raaij, 2016). Sophisticated early diagnostic techniques are needed to enable DHH infants and toddlers to receive effective, early, and holistic interventions. This is important because it is known that early

interventions are associated with better developmental outcomes in DHH children (Holzinger, Fellinger & Beitel, 2011; Yoshinaga-Itano, 2003, 2006).

First data with the SEAM in a preliminary explorative German version indicates that this instrument provides reliable and valid information on social–emotional development. In our two studies in DHH infants and toddlers, the SEAM demonstrated comparable internal consistency to that reported in the manual. Analysis of the relationships between the SEAM scale scores and the corresponding competences as operationalized in the ITSEA, a validated instrument also used with DHH children, revealed a consistent pattern of correlations in the expected direction. This confirms that the SEAM captures variance in important domains of social–emotional development. The results of Study 2 also confirm the inter-rater reliability of the SEAM scales; on all SEAM scales ratings provided by mother and intervention providers working with the families were similar. The SEAM also seems to be suitable for use in educational practice with DHH children and their families. The usability of the SEAM may reflect the fact that the items relate to families' everyday activities and experiences and there are several illustrative examples to help parents to understand what each item means. The data from a short retrospective survey of the early intervention providers who participated in Study 2 appear to confirm this as participants that they found the SEAM scales easier to fill in than the ITSEA scale, because the SEAM items were more contextualized, more concrete, and more closely related to behavior. This may have contributed to a high accordance in the ratings of the SEAM scales, whereas for some of the ITSEA scales at least for the toddler group, there were significant differences that may be founded in too short wording of the items without any situational context. A last point in favor of using the SEAM in the context of a competence-oriented approach to deaf education is that this instrument captures information about a broader range of competences than the ITSEA; it has the further advantage that it can be used to evaluate or track social–emotional development in DHH children from as early as two months old.

Because there are no normative SEAM data for hearing children against which to compare our data from DHH infants and toddlers, our conclusions must be considered preliminary. The data, nevertheless, do reveal information that allows some conservative conclusions in relation to data from other studies with DHH children.

In Study 1 parents' evaluation of their children's social–emotional competences with the SEAM presented a rather positive picture of five domains ("Participation," "Expressing emotions," "Self-regulation," "Autonomy" and "Cooperation") in both age groups and this picture was confirmed by the data from Study 2. Study 2 also demonstrated that early intervention providers evaluated the children's competence in the SEAM domains in a comparably positive light. Although we have no direct evidence for this hypothesis from our own data, it appears that the generally positive picture of DHH children's social and emotional development which emerges from our research may be related to the better opportunities early intervention provides today. At least for the DHH toddlers in Study 2, we have information that nearly 89% of them have been detected by UNHS and did get early intervention support within the first six months. Perhaps these interventions help parents to better understand reactions and actions specific to DHH children and teach them how to promote social and emotional competence in their DHH child. Overall, we suggest that our data demonstrate the positive impact of the UNHS in equipping parents with the skills needed to cope with the challenge of raising a DHH child.

The lower scores in both age groups and in both studies for the SEAM domains "Empathy" and "Positive self-image" have particular importance for deaf education. Inspection of the items used to assess these domains reveals that these social–emotional competences may be more strongly associated with language skills (e.g., "toddlers tries to comfort others when they are upset"; "toddler uses words/signs to talk about another child's emotions"; "toddler tells or signs you what she or he did or accomplished"; "toddler knows personal information"). Rieffe et al. (2015) gave some reasons why emotional development may pose particular challenges for DHH children: "… facial expressions have to be interpreted; understanding them does not come automatically. We need a social context, providing exposure and feedback, in which they are taught and trained" (p. 378). It seems that to learn to understand emotions, it is not enough to see them in others' faces, young children also need to talk a lot about what they see. Empirical studies with DHH preschool children revealed that they find dialogic learning difficult if their language skills are poor (Wiefferink et al., 2013; Ziv, Most & Cohen, 2013).

Parental responsivity is critical to the development of social–emotional competences in DHH infants and toddlers. It has already been well documented that parental responsivity is the key to language development (Moeller, Carr, Seaver, Stredler-Brown & Holzinger, 2013; Pressman, Pipp-Siegel, Yoshinaga-Itano, & Deas, 1999; Pressman, Pipp-Siegel, Yoshinaga-Itano, Kubicek, & Emde, 2000) and the data presented in this study indicate that parental responsivity is similarly important for social–emotional development. Parents who are more able (perhaps with the support of a competent early intervention provider) to understand the signals of their DHH child and to respond to him or her verbally and non-verbally may help their child to develop social–emotional competence. This result may indicate the need for supporting families with DHH infants in this regard. Data on hearing children with various developmental problems (Young Kong & Carta, 2011) as well as early results in DHH children (James, Wadnerkar-Kamble, & Lam-Cassettari, 2013; Lam-Cassettari, Wadnerkar-Kamble, & James, 2015; Reichmuth, Embacher, Matulat, Am Zehnhoff-Dinnesen & Glanemann, 2013) highlight that therapeutic interventions (e.g., by video feedback) can increase parental responsivity that is associated with better parent–child interaction child development.

A diverse body of research in DHH children demonstrates that they are particularly vulnerable to developmental problems if they have an additional impairment. Cupples et al. (2013) documented this with respect to language development in a study of 119 three-year-old DHH children who also had other impairment such as cerebral palsy, visual impairment, or other developmental problems. Our study has shown that having an additional disability also has an adverse effect on the social–emotional development of DHH infants and toddlers. Families with DHH infants or toddlers with additional disabilities obviously face specific challenges and need early, specialist support.

Our research also indicated that in DHH toddlers social–emotional competence is associated with a number of sociodemographic factors. One of these factors is having deaf parents; DHH toddlers with deaf parents had greater social–emotional competence than their peers with hearing parents. This may be because deaf parents are better be able to provide a DHH child with social and emotional support (Dammeyer & Marschark, 2016;

Meadow-Orlans et al., 2004; Spencer, 2003), but it is also possible that based on their own experience deaf parents are more confident about their child's development and therefore give higher ratings.

A further point of interest in the data on the older group is that it corroborates earlier research showing that the severity of hearing loss is an important factor in DHH children's development (Teasdale & Sorensen, 2007). DHH toddlers with severe or profound hearing loss appeared to have more problems in developing social–emotional competences. The obvious interpretation is that DHH toddlers with more severe hearing loss have more problems with communication and hence with social and emotional development. Unfortunately, we did not collect data on language or communicative competence in our studies and so we cannot comment further on this.

Finally, parental educational background also seems to be an important factor in DHH toddlers' social–emotional development. Toddlers from better educated families obtained higher scores on the measures of social–emotional development used in this study. These results are once again consistent with research by Cupples et al. (2013) on language development in DHH children with additional disabilities. A possible explanation for this result is that more highly educated parents more often tackle emotional and social issues in dialogs with their DHH child; however, it is also possible that these parents have more "social capital" and hence better access to social events in which their children can participate. Yet another possibility is that more highly educated parents are better able to support their child's development of autonomy, which begins to be an important competence from the second year of life.

Overall, the results of our study, in particular those relating to sociodemographic factors, confirm those of the large Australian longitudinal LOCHI study (Ching et al., 2013). Ching et al. investigated 450 early-detected DHH children at several time points using a series of developmental tests. Multiple regression analyses of data collected when the children were three years old (which is comparable to the age of the toddlers in the study presented here) revealed five positive predictors of development—less severe hearing loss, absence of additional disability, high maternal educational status, female sex, and earlier implantation in the case of children who wear a cochlear implant—the first three of these were also positively associated with social–emotional competence in our study.

Limitations

The studies presented here are subject to a number of limitations although the data are consistent with other research on development in DHH children. Firstly, the samples we studied are not representative insofar as participation was voluntary and depended on the parents' willingness to participate. This may have contributed to the recruitment of a privileged sample in which more than half the parents had a university entrance qualification and may have led to the rather high evaluations of social–emotional competences.

In subsequent research with the SEAM, some additional information about parental experiences would be useful that go beyond the characteristics considered in this study. For example, it could be of interest to learn something about the kind of support parents receive immediately after their child has been detected by the UNHS (parent–child interaction training, which kind of language support, etc.). Also of interest could be to obtain some information on characteristics regarding family structures (single parent, first time or second time parents, siblings (including DHH ones), employment, and conditions to combine family and job, etc.).

It is also important to note that although analyses of the reliability and validity of the instruments we used produced positive results, we were working with preliminary translations of these instruments that were developed in English and used so far mostly with American infants and toddlers (cf. Footnote 1). Additionally, we have to point to the fact that for the SEAM, there are no normative data from a hearing sample available.

A next important issue that should be taken into account for further studies using the SEAM (and also the ITSEA) is that these instruments primarily have been developed for hearing infants. It should be examined if its items are enough "deaf sensitive" or have to be adapted in some way to improve this assessment tool for testing socio-emotional development in DHH infants. From our data, we cannot make any statement related to this issue.

Yet another point to note is that we did not control for variance in the participating children's language development. Parallel assessment of language development would have enabled us to contribute to understanding of the close relationship of language and emotion and should be considered in future research using the SEAM instrument.

Finally, we recommend that in future research data collected using the SEAM scales be supplemented by observational data on children's behavior in real-life situations and by an analysis of parent–child interactions.

Notes

1. This is just a first test regarding the suitability of the SEAM scales for German DHH children which is restricted to the studies presented here. A professional translation (with back translation) and further studies of the reliability and validity of a German version are required in order to prepare a request for permission to publish a German version of the questionnaire.
2. The numbers in brackets indicate, respectively, the number of items in the infant and toddler versions of the SEAM.

Conflicts of Interest

The authors have no conflicts of interest to report.

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